WE CLAIM:

xx 1. A well control and monitoring system for the control and monitoring of a plurality of wells comprising:

a remote control center;

a plurality of surface control and monitoring systems, wherein each of the wells is provided with a corresponding one of the surface control and monitoring systems, and wherein the surface control and monitoring systems are in communication with the remote control center; and,

a plurality of down hole monitoring and control systems, wherein each of the wells is provided with at least one of the down hole monitoring and control systems, wherein each of the down hole monitoring and control systems is in communication with at least one of the surface control and monitoring systems, and wherein each of the down hole monitoring and control systems comprises a non-cooled, high temperature controller arranged to perform monitoring and control functions within a corresponding one of the wells.

2. The well control and monitoring system of claim 1 further comprising at least one sensor coupled to the controller of at least one of the down hole monitoring and control systems.

3. The well control and monitoring system of claim 2 further comprising a multiplexer coupling the sensor to the controller of the at least one of the down hole monitoring and control systems, wherein the multiplexer comprises a non-cooled, high temperature multiplexer.

4. The well control and monitoring system of claim 2 further comprising an amplifier coupling the sensor to the controller of the at least one of the down hole monitoring and control systems, wherein the amplifier comprises a non-cooled, high temperature amplifier.

5. The well control and monitoring system of claim 2 further comprising an analog-to-digital converter coupling the sensor to the controller of the at least one of the down hole monitoring and control systems, wherein the analog-to-digital converter comprises a non-cooled, high temperature analog-to-digital converter.

6. The well control and monitoring system of claim 2 further comprising a multiplexer and an amplifier coupling the sensor to the controller of the at least one of the down hole monitoring and control systems, wherein the multiplexer comprises a non-cooled, high temperature multiplexer, and wherein the amplifier comprises a non-cooled, high temperature amplifier.

7. The well control and monitoring system of claim 2 further comprising a multiplexer and an analog-to-digital converter coupling the sensor to the controller of the at least one of the down hole monitoring and control systems, wherein the multiplexer comprises a non-cooled, high temperature multiplexer, and wherein the analog-to-digital converter comprises a non-cooled, high temperature analog-to-digital converter.

8. The well control and monitoring system of claim 2 further comprising an amplifier and an analog-to-digital converter coupling the sensor to the controller of the at least one of the down hole monitoring and control systems, wherein the amplifier comprises a non-cooled, high temperature amplifier, and wherein the

analog-to-digital converter comprises a non-cooled, high temperature analog-to-digital converter.

9. The well control and monitoring system of claim 2 further comprising a multiplexer, an amplifier, and an analog-to-digital converter coupling the sensor to the controller of the at least one of the down hole monitoring and control systems, wherein the multiplexer comprises a non-cooled, high temperature multiplexer, wherein the amplifier comprises a non-cooled, high temperature amplifier, and wherein the analog-to-digital converter comprises a non-cooled, high temperature analog-to-digital converter.

10. The well control and monitoring system of claim 1 wherein at least one of the down hole monitoring and control systems comprises a transducer arranged to perform a conversion between an electrical signal and an acoustic signal, and wherein the acoustic signal conveys information through at least one well.

11. The well control and monitoring system of claim 1 wherein at least one of the down hole monitoring and control systems comprises at least one electromechanical device controlled by the controller of

the at least one of the down hole monitoring and control systems.

12. The well control and monitoring system of claim 1 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature multiplexer.

13. The well control and monitoring system of claim 1 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature amplifier.

14. The well control and monitoring system of claim 1 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature analog-to-digital converter.

15. The well control and monitoring system of claim 1 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature multiplexer and a non-cooled, high temperature amplifier.

16. The well control and monitoring system of claim 1 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature multiplexer and a non-cooled, high temperature analog-to-digital converter.

17. The well control and monitoring system of claim 1 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature amplifier and a non-cooled, high temperature analog-to-digital converter.

18. The well control and monitoring system of claim 1 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature multiplexer, a non-cooled, high temperature amplifier, and a non-cooled, high temperature analog-to-digital converter.

19. The well control and monitoring system of claim 1 wherein the non-cooled, high temperature controller comprises a non-cooled, high temperature transceiver.

20. The well control and monitoring system of claim 19 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature multiplexer.

21. The well control and monitoring system of claim 19 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature amplifier.

22. The well control and monitoring system of claim 19 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature analog-to-digital converter.

23. The well control and monitoring system of claim 19 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature multiplexer and a non-cooled, high temperature amplifier.

24. The well control and monitoring system of claim 19 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature multiplexer and a non-cooled, high temperature analog-to-digital converter.

25. The well control and monitoring system of claim 19 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature amplifier and a non-cooled, high temperature analog-to-digital converter.

26. The well control and monitoring system of claim 19 wherein at least one of the down hole monitoring and control systems comprises a non-cooled, high temperature multiplexer, a non-cooled, high temperature amplifier, and a non-cooled, high temperature analog-to-digital converter.

xx 27. A well control and monitoring system for the control and monitoring of a well comprising:

a first control and monitoring system located above the well, wherein the first control and monitoring system comprises a controller and a transceiver; and,

a second monitoring and control system provided within the well, wherein the second monitoring and control system comprises a non-cooled, high temperature controller and a non-cooled, high temperature transceiver, and wherein the first and second control and monitoring systems communicate with one another through their respective transceivers.

28. The well control and monitoring system of claim 27 wherein the second monitoring and control systems comprises at least one sensor coupled to the controller of the second monitoring and control system.

29. The well control and monitoring system of claim 28 further comprising a multiplexer coupling the sensor to the controller of the second monitoring and control system, wherein the multiplexer comprises a non-cooled, high temperature multiplexer.

30. The well control and monitoring system of claim 28 further comprising an amplifier coupling the sensor to the controller of the second monitoring and control system, wherein the amplifier comprises a non-cooled, high temperature amplifier.

31. The well control and monitoring system of claim 28 further comprising an analog-to-digital converter coupling the sensor to the controller of the second monitoring and control system, wherein the analog-to-digital converter comprises a non-cooled, high temperature analog-to-digital converter.

32. The well control and monitoring system of claim 28 further comprising a multiplexer and an amplifier coupling the sensor to the controller of the second monitoring and control system, wherein the multiplexer comprises a non-cooled, high temperature multiplexer, and wherein the amplifier comprises a non-cooled, high temperature amplifier.

33. The well control and monitoring system of claim 28 further comprising a multiplexer and an analog-to-digital converter coupling the sensor to the controller of the second monitoring and control system, wherein the multiplexer comprises a non-cooled, high temperature multiplexer, and wherein the analog-to-digital converter comprises a non-cooled, high temperature analog-to-digital converter.

34. The well control and monitoring system of claim 28 further comprising an amplifier and an analog-to-digital converter coupling the sensor to the controller of the second monitoring and control system, wherein the amplifier comprises a non-cooled, high temperature amplifier, and wherein the analog-to-digital converter comprises a non-cooled, high temperature analog-to-digital converter.

35. The well control and monitoring system of claim 28 further comprising a multiplexer, an amplifier, and an analog-to-digital converter coupling the sensor to the controller of the second monitoring and control system, wherein the multiplexer comprises a non-cooled, high temperature multiplexer, wherein the amplifier comprises a non-cooled, high temperature amplifier, and wherein the analog-to-digital converter comprises a non-cooled, high temperature analog-to-digital converter.

36. The well control and monitoring system of claim 27 wherein the second monitoring and control system comprises a transducer arranged to perform a conversion between an electrical signal and an acoustic signal, and wherein the acoustic signal conveys information through the well.

37. The well control and monitoring system of claim 27 wherein the second monitoring and control system comprises at least one electromechanical device controlled by the controller of the second monitoring and control system.

38. The well control and monitoring system of claim 27 wherein the second monitoring and control system comprises a non-cooled, high temperature multiplexer.

39. The well control and monitoring system of claim 27 wherein the second monitoring and control system comprises a non-cooled, high temperature amplifier.

40. The well control and monitoring system of claim 27 wherein the second monitoring and control system comprises a non-cooled, high temperature analog-to-digital converter.

41. The well control and monitoring system of claim 27 wherein the second monitoring and control system comprises a non-cooled, high temperature multiplexer and a non-cooled, high temperature amplifier.

42. The well control and monitoring system of claim 27 wherein the second monitoring and control system comprises a non-cooled, high temperature multiplexer and a non-cooled, high temperature analog-to-digital converter.

43. The well control and monitoring system of claim 27 wherein the second monitoring and control system comprises a non-cooled, high temperature amplifier and a non-cooled, high temperature analog-to-digital converter.

44. The well control and monitoring system of claim 27 wherein the second monitoring and control system comprises a non-cooled, high temperature multiplexer, a non-cooled, high temperature amplifier, and a non-cooled, high temperature analog-to-digital converter.

45. The well control and monitoring system of claim 27 wherein the first monitoring and control system is located at a surface of the well.

xx 46. A down hole monitoring and control system provided within a well, wherein the down hole monitoring and control system comprises:

a non-cooled, high temperature controller; and,

a non-cooled, high temperature transceiver coupled to the non-cooled, high temperature controller, wherein the non-cooled, high temperature transceiver transmits signals into the well and receives signals from the well.

47. The down hole control and monitoring system of claim 46 further comprising a transducer arranged to perform a conversion between an electrical signal and an acoustic signal, and wherein the acoustic signal conveys information through the well.

48. The down hole control and monitoring system of claim 47 further comprising an anechoic material coating at least a portion of the transducer.

49. The down hole control and monitoring system of claim 46 wherein the non-cooled, high temperature controller comprises a non-cooled, high temperature controller that can be remotely turned on and off.

50. The down hole control and monitoring system of claim 46 wherein the non-cooled, high temperature controller comprises a self-powered non-cooled, high temperature controller.

51. The down hole control and monitoring system of claim 46 wherein the non-cooled, high temperature controller comprises a non-cooled, high temperature controller that is powered remotely by electrical wire.

52. The down hole control and monitoring system of claim 46 wherein the non-cooled, high temperature controller comprises a non-cooled, high temperature controller that is powered remotely by optical cable.

53. The down hole control and monitoring system of claim 46 further comprising at least one electromechanical device controlled by the controller.

54. The down hole control and monitoring system of claim 46 further comprising a non-cooled, high temperature multiplexer.

55. The down hole control and monitoring system of claim 46 further comprising a non-cooled, high temperature amplifier.

56. The down hole control and monitoring system of claim 46 further comprising a non-cooled, high temperature analog-to-digital converter.

57. The down hole control and monitoring system of claim 46 further comprising a non-cooled, high temperature multiplexer and a non-cooled, high temperature amplifier.

58. The down hole control and monitoring system of claim 46 further comprising a non-cooled, high temperature multiplexer and a non-cooled, high temperature analog-to-digital converter.

59. The down hole control and monitoring system of claim 46 further comprising a non-cooled, high temperature amplifier and a non-cooled, high temperature analog-to-digital converter.

60. The down hole control and monitoring system of claim 46 wherein the signals comprises pulses.

61. The down hole control and monitoring system of claim 46 further comprising a non-cooled, high temperature multiplexer, a non-cooled, high temperature amplifier, and a non-cooled, high temperature analog-to-digital converter.